

REMARKS

This responds to the Office Action mailed on November 30, 2005.

Claims 76, 78, 79, 84, 85, and 91 are amended, no claims are canceled, and claim 92 is added; as a result, claims 2, 3, 7-9, and 65-76, 78-79, 84-85, 89, 91-92 are now pending in this application.

Claim Amendments and Additions

The amendments and additions to the claims are fully supported by the specification as originally filed, and no new matter will be added by entry of the amendment. The amendments and additions to the claims are made to satisfy Applicant's preferences, not necessarily to satisfy any legal requirement(s) of the patent laws. The amendments clarify the claims and are not intended to limit the scope of equivalents to which any claim element may be entitled. Applicant respectfully requests reconsideration of the above-identified application in view of the amendments above and the remarks that follow.

Independent claims 76, 78, and 84 have been amended to include delivering "low-inductance current to the die, via the substrate *directly and not via the interposer*."

Independent claims 76, 78, and 84 have also been amended to include: "a package stiffener disposed upon the die-side of the substrate directly and not upon an interposer"; "a package stiffener mounted at a perimeter of the substrate directly and not upon an interposer"; and "a frame disposed upon the die-side of the substrate directly and not upon an interposer", respectively.

Support for these additions may be found at, for example, Figure 6, and paragraph 38 of 20030062602, the patent publication corresponding to the present application, which recites, in part: "As the package interposers are not required for power delivery function, the resultant package complexity stack-height, and thereby inductance, is lessened."

Added claim 92, and amended claims are also readable on Group I, species A: Embodiment I: Figs. 1-7 and 11-13.

§103 Rejection of the Claims

Rejection

Claims 7, 9, 65-76, 78, 79, 84, 85, 89 and 91 were rejected under 35 USC § 103(a) as being unpatentable over Dibene, II et al. (U.S. 6,452,113) in view of Dibene, II et al. (U.S. 6,452,804), Belady (U.S. 6,285,550) and Hembree et al. (U.S. 2001/0001542). Applicant respectfully traverses this rejection.

Law

“In order for the Examiner to establish a *prima facie* case of obviousness, three base criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Appellant’s disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ 2d 1438 (Fed.Cir. 1991).” *M.P.E.P.* §2142. (emphasis added.)

Motivation to combine or modify the prior art is lacking when the prior art teaches away from the claimed combination. A reference teaches away, when a person of ordinary skill, upon reading the reference, would be led in a direction divergent from the path the applicant took. *In re Gurley*, 27 F.3d 551, 31 USPQ 2d 1130, 1131 (Fed. Cir. 1994); *United States v. Adams*, 383 U.S. 39, 52, 148 USPQ 479, 484 (1966); *In re Spannable*, 405 F.2d 578, 587, 160 USPQ 237, 244 (C.C.P.A. 1969); *In re Caldwell*, 319 F.2d 254, 256, 138 USPQ 243, 245 (C.C.P.A. 1963).

Argument For Currently Rejected Claims

Page 4 of the Current Action admits that Dibene ‘113 fails to explicitly teach the “frame being a package stiffener” and looks to Dibene ‘804 to teach an ‘assembly (102/103)... delivering ... current [and providing] a ...support to the *interposer* substrate (104).” (emphasis added).

Paragraph 33 of the current Application, U.S. Patent Publication No. 20030062602, discusses issues with regard to reduced rigidity or stiffness to the substrate:

"Where the substrate 110 is a thin-core, or coreless substrate, the FIG. 5 arrangement has further disadvantage. Due to reduced rigidity or stiffness, of such substrates, when pressure is applied thereto (e.g., during mounting) substrate deflection, or bending, may result. Such deflection, or bending, may result in die cracking, or may prevent or break critical electrical bonding."

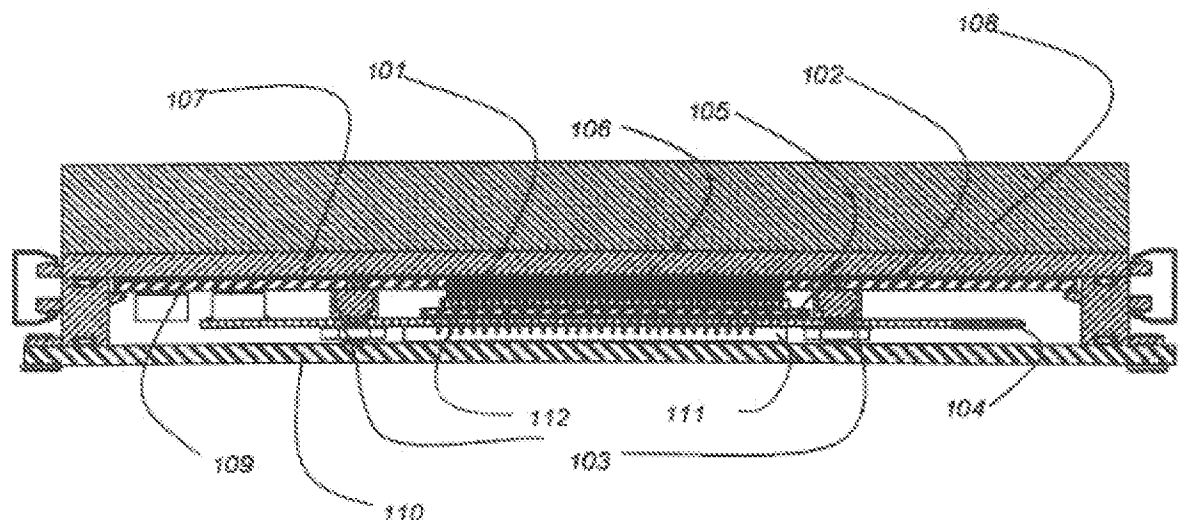
The previous claim language of claim 76 (before the current amendment) includes: the package stiffener being 'disposed upon the die-side of the *substrate*' and delivering "current to the die, via the *substrate*.' Further, a 'die is disposed upon the die-side of the substrate.'

The previous claim language of claim 78 (before the current amendment) includes: the 'package stiffener mounted at a perimeter of the substrate'... and 'to deliver low-inductance current to the die, via the substrate, while concurrently providing stiffening support to the substrate.

The previous claim language of claim 84 (before the current amendment) includes: 'a frame disposed upon the die-side of the substrate... and to deliver low-inductance current to the die, via the substrate, while concurrently providing stiffening support to the substrate.'

Claims 76, 78 and 84 are each clearly distinguishable from both Dibene '113 (as admitted in the Action) and Dibene '804 (emphasis added).

For example, Figure 1 of Dibene '804 clearly illustrates that the assembly 102/103 is mounted to the interposer substrate 104 rather than the circuit board 105 (substrate):



The interposer 104 of Dibene '804 is defined in a discussion beginning at col. 4, line 53 of Dibene '804 as *between* the circuit board (substrate 105) and the motherboard 110:

"To address the requirements described above, the present invention discloses a modular three dimensional configuration including an electronic circuit such as a microprocessor mounted to a multilayer circuit board or substrate such as, but not limited to, an Organic Land Grid Array (OLGA) or a Ceramic Land Grid Array (CLGA) or Low Temperature Co-fired Ceramic (LTCC) using C-4 (controlled collapse chip connection) technology. Typically the circuit board is populated with external, metallized lands on the surface opposite the microprocessor chip. This circuit board is usually bonded to an interposer board that is populated with an array of metal pins on the opposite surface that can be connected to a socket that is surface mounted onto a motherboard. Typically, power is delivered to the microprocessor from an externally configured power regulator through the motherboard, the socket, the interposer board, the OLGA and finally to the microprocessor chip." (Emphasis added).

Because Dibene '804 teaches an assembly 102/103 mounted to the interposer substrate 104, rather than the circuit board 105, Dibene '804 *teaches away* from the frame being disposed upon the die-side of the substrate, as recited in claim 84, for instance. Therefore, Dibene '113 and Dibene '804 cannot be combined to teach an assembly being disposed upon the die-side of the substrate as suggested in the Action.

Also, as shown in Figure 1 above, Dibene '804 teaches away from the package stiffener being 'disposed upon the die-side of the *substrate*' of claim 76, and Dibene '804 teaches away from the 'package stiffener mounted at a perimeter of the *substrate*' as claimed in claim 78.

Accordingly, independent claims 76, 78 and 84 are patentable over the cited references, and Applicant respectfully requests reconsideration of the pending claims.

Argument For Currently Amended Claims

However, independent claims 76, 78 and 84 have been amended to clarify the claim language by distinguishing the interposer substrate from the circuit board substrate. Therefore, the rejection with regard to these claims and their dependents is moot. However, to facilitate prosecution, the presently pending claims are also distinguished from Dibene '804 and Dibene '113 herein.

There is a lack of motivation to combine references because Dibene '804 teaches away from the claims.

Independent claims 76, 78, and 84 have been amended to include delivering "low-inductance current to the die, via the substrate *directly and not via the interposer*."

Independent claims 76, 78, and 84 have also been amended to include: "a package stiffener disposed upon the die-side of the substrate directly and not upon an interposer"; "a package stiffener mounted at a perimeter of the substrate directly and not upon an interposer"; and "a frame disposed upon the die-side of the substrate directly and not upon an interposer", respectively.

In the current Application, U.S. Patent Publication No. 20030062602, the interposer (or lack thereof) is discussed, for example, at paragraph 38:

"As the package interposers are not required for power delivery function [in the FIG. 6 embodiment], the resultant package complexity stack-height, and thereby inductance, is lessened."

In contrast to the currently pending claims, Dibene '804 teaches an assembly to deliver current through the *interposer board* and mounted to the *interposer board*.

Dibene '804 teaches that power is delivered through the interposer board (104): "Typically, power is delivered to the microprocessor from an externally configured power regulator through the motherboard, the socket, the *interposer board*, the OLGA [*the substrate*] and finally to the microprocessor chip." At col. 4, line 66-col. 5, line 2, Dibene '804 (emphasis added). Further, at col. 5, lines 24-30, Dibene '804 states: "This embodiment provides a modular package in which the mechanical standoffs serve many purposes. First, *they provide a low inductance path directly to the interposer board* located in close proximity to the microprocessor, rather than the higher inductance path through the motherboard substrate, socket and other elements of the electrical path." (emphasis added). See also Col. 7, lines 38-51 of Dibene '804.

Clearly Dibene '804 teaches away from delivering "current to the die, via the substrate *directly and not via the interposer*" as claimed. In fact, a person skilled in the art, upon reading Dibene ('804), would be led to use an interposer to deliver current, which is a completely different path from the one that the Applicant took.

In addition, Dibene '804 clearly teaches away from a package stiffener (claims 76 or 78) or a frame (claim 84) from being disposed upon the "substrate directly and not upon an interposer." See Figure 1 of Dibene '804, above. In fact, a person skilled in the art, upon reading Dibene ('804), would be led to use an interposer to directly attach to the assembly that is providing the current, which is a completely different path from the one that the Applicant took.

Accordingly, independent claims 76, 78 and 84 are patentably distinguishable from Dibene ('113) and Dibene ('804).

Claims 7, 9, 65-75, 79, 85, 89, 91-92 which depend directly or indirectly from claims 76, 78 and 84 and incorporate all of the limitations therein, are also asserted to be allowable for the reasons presented above, and Applicant respectfully requests notification of same.

Applicant considers additional elements of claims 7, 9, 65-75, 79, 85, 89, 91-92 to further distinguish over the cited references, and Applicant reserves the right to present arguments to this effect at a later date.

Allowable Subject Matter

Claims 2, 3, and 8 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 2, 3, and 8 depend from independent claim 78, which is now in condition for allowance. Therefore, claims 2, 3 and 8 have not been rewritten.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney, Lucinda Price (located in Gainesville, Florida), at (352) 373-8804, to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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